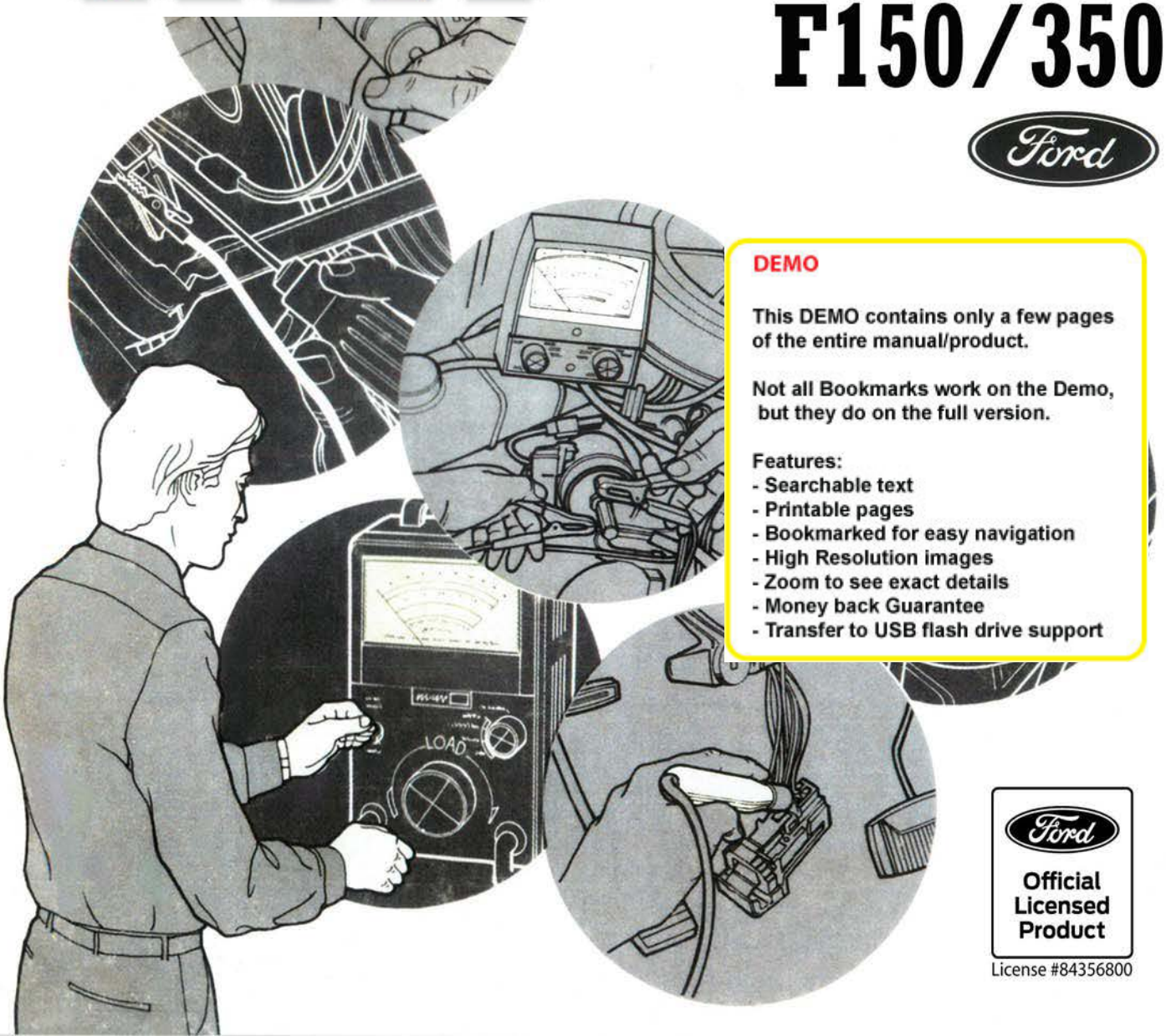
1985 BRONCO/ F150/350

Ford



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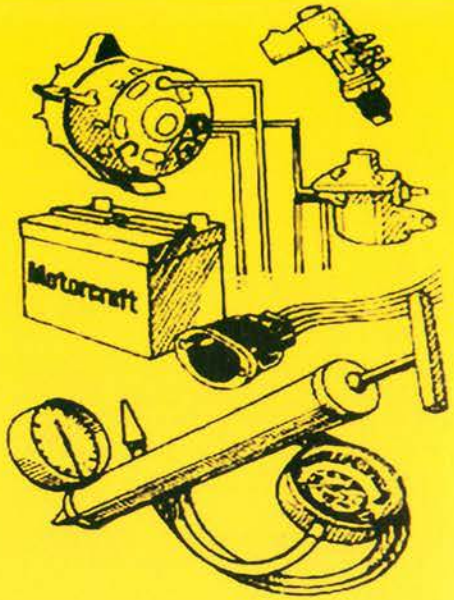
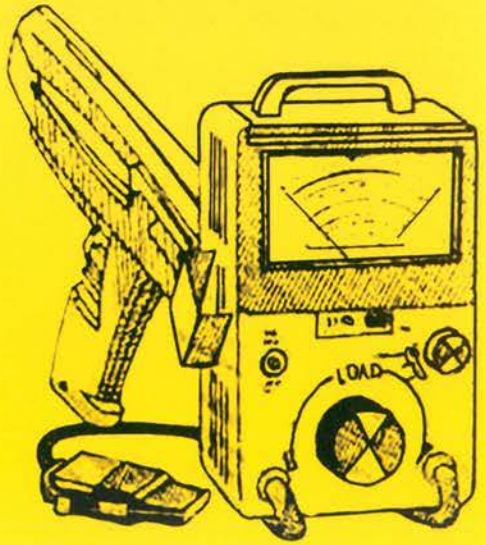


Electrical & Vacuum Trouble-Shooting Manual



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IMPORTANT SAFETY NOTICE

Appropriate service methods and proper repair procedures are essential for the safe, reliable operation of all motor vehicles, as well as the personal safety of the individual doing the work. This Manual provides general directions for accomplishing service and repair work with tested, effective techniques. Following them will help assure reliability.

There are numerous variations in procedures, techniques, tools, and parts for servicing vehicles; as well as in the skill of the individual doing the work. This Manual cannot possibly anticipate all such variations and provide advice or cautions as to each. Accordingly, anyone who departs from the instructions provided in this Manual must first establish that he compromises neither his personal safety nor the vehicle integrity by his choice of methods, tools or parts.

The purpose of this manual is to show electrical and vacuum circuits of these vehicles in a clear and simple fashion to make troubleshooting easier. With each circuit is a description of *How the Circuit Works* and some *Troubleshooting Hints*. A *Component Location* chart lists components, connectors, and grounds in that circuit. The chart includes a description of where each item is located, and references to pictures in the manual.

Wiring Diagrams give a schematic picture of when and how the circuit is powered, what the current path is to circuit components, and how the circuit is grounded. Each circuit component is named (underlined titles). Wire and connector colors are listed (standard Ford color abbreviations are used):

COLOR ABBREVIATIONS

BL	**Blue**	**N**	**Natural**
BK	**Black**	**O**	**Orange**
BR	**Brown**	**PK**	**Pink**
DB	**Dark Blue**	**P**	**Purple**
DG	**Dark Green**	**R**	**Red**
GR	**Green**	**T**	**Tan**
GY	**Gray**	**W**	**White**
LB	**Light Blue**	**Y**	**Yellow**
LG	**Light Green**		

Where two colors are shown for a wire, the first color is the basic color of the wire. The second color is the dot, hash, or stripe marking. If **D** or **H** is given, the second color is dots or hash marks. If there is no letter after the second color, the wire has a stripe.

For example:

BR/O is a brown wire with an orange stripe.
R/Y D is a red wire with yellow dots.
BK/W H is a black wire with white hash marks.

Connector end views of switches and other components are shown to help with bench testing. The views show the harness wire colors that connect to the mating terminals. Connector colors and locations are shown in the *Component Location* chart. Two-color listings indicate separate colors for each connector half.

Components which work together are shown together. For example, all electrical components used in any circuit are shown on one diagram. The circuit breaker or fuse is shown at the top of the page. All wires, connectors, splices, switches, and motors are shown in the flow of current to ground at the bottom of the page. Notes are included which describe how switches and other components work. If a component is used in several different circuits, it is shown in several places. For example, the **Main Light Switch** is an electrical part of many circuits, and is repeated on many pages. In some cases, however, a component may seem, by its name, to belong on a page where it has no electrical connection. For example, **Radio Illumination** is electrically part of **Instrument Illumination.** Since it has no electrical connection at all with the actual **Radio** circuit, it is not shown on the **Radio** page.

Troubleshooting Hints point the technician in a general direction, but are not intended as a step-by-step procedure. Ignition troubleshooting is an exception to this. It includes a step-by-step procedure of basic quick checks to locate some of the more common **Ignition System** problems. Read the Shop Manual for more detailed repair procedures.

The **Grounds** pages show detailed views of multiple component ground points. This is useful for checking interconnections among the ground circuits of different diagrams.

Notes, Cautions, and **Warnings** appear in boxes on text pages and contain important **vehicle and mechanic safety information.**

Notes give added information to help complete a particular procedure. Cautions are included to prevent making an error that could damage the vehicle. Warnings highlight areas where carelessness can cause personal injury. The following list contains some general **Warnings** that should be followed when working on a vehicle.

- Always wear safety glasses for eye protection.
- Use safety stands whenever a procedure requires being under a vehicle.
- Be sure that the **Ignition Switch** is always in the OFF position, unless otherwise required by the procedure.
- Set the parking brake when working on any vehicle. An automatic transmission should be in PARK. A manual transmission should be in NEUTRAL.
- Operate the engine only in a well-ventilated area to avoid the danger of carbon monoxide.
- Keep away from moving parts when the engine is running, especially the fan and belts.
- To prevent serious burns, avoid contact with hot metal parts such as the radiator, exhaust manifold, tail pipe, catalytic converter, and muffler.
- Do not allow flame or sparks near the battery. Gases are always present in and around the battery cell. An explosion could occur.
- Do not smoke.
- To avoid injury, always remove rings, watches, loose hanging jewelry, and loose clothing.

TROUBLESHOOTING STEPS

These six steps present an orderly method of troubleshooting:

Step 1. Verify the problem.

- Operate the complete system and see all symptoms for yourself in order to:
  - —check the accuracy and completeness of the customer's complaint.
  - —learn more that might give a clue to the nature and location of the problem.

Step 2. Narrow the problem.

- Using this manual, narrow down the possible causes and locations of the problem in order to more quickly find the exact cause.
- Read the description of *How the Circuit Works* and study the wiring diagram. You should then know enough about the circuit operation to figure out where to check for this trouble.

Step 3. Test the cause.

- Use electrical test procedures to find the specific cause of the symptoms.
- *Troubleshooting Hints* will give some helpful ideas.
- The *Component Location* charts and the pictures will help you find components, grounds, and connectors.

Step 4. Verify the cause.

- Confirm the fact that you have found the correct cause through operating the parts of the circuit you think are good.

Step 5. Make the repair.

- Repair or replace the faulty component.

Step 6. Verify the repair.

- Operate the system as in Step 1 and check that your repair has removed all symptoms, and also has not caused any new symptoms.

Some engine circuits may need special test equipment and special procedures. See the *Shop Manual* and other service books for details. You will find the circuits in this manual to be helpful with these special tests.

TROUBLESHOOTING TOOLS

JUMPER WIRE

This is a test lead used to connect two points of a circuit. A **Jumper Wire** can complete a circuit by bypassing an open.

Uses: Bypassing Switches or Open Circuits

WARNING

Never use a jumper wire across loads (motors, etc.) connected between hot and ground. This direct battery short may cause injury or fire.

VOLTMETER

A DC **Voltmeter** measures circuit voltage. Connect negative (- or black) lead to ground, and positive (+ or red) lead to voltage measuring point.

OHMMETER

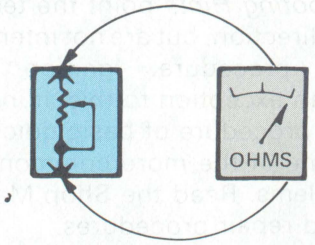


Figure 1— Resistance Check

An **Ohmmeter** shows the resistance between two connected points (Figure 1).

TEST LIGHT

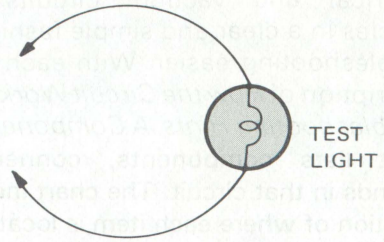


Figure 2 —Test Light

A **Test Light** is a 12-volt bulb with two test leads (Figure 2).

Uses: Voltage Check. Short Check

SELF-POWERED TEST LIGHT

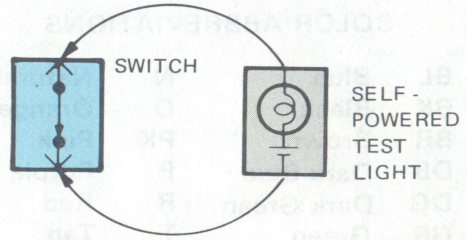


Figure 3—Continuity Check

The **Self-Powered Test Light** is a bulb, battery and set of test leads wired in series (Figure 3). When connected to two points of a continuous circuit, the bulb glows.

Uses: Continuity Check. Ground Check

CAUTION

When using a self-powered test light or ohmmeter, be sure power is off in circuit during testing. Hot circuits can cause equipment damage and false readings.

TROUBLESHOOTING CHECKS

SWITCH CIRCUIT CHECK

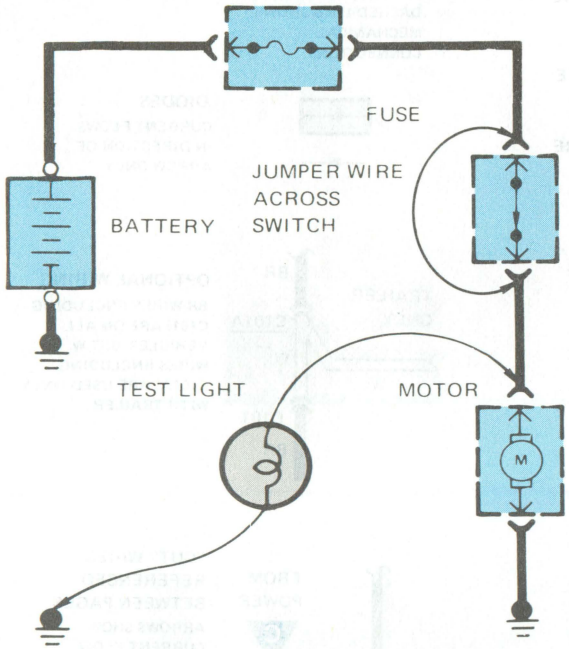


Figure 4—Switch Circuit Check and Voltage Check

In a bad circuit with a switch in series with the load, jumper the terminals of the switch to power the load. If jumping the terminals powers the circuit, the switch is bad (Figure 4).

CONTINUITY CHECK (Locating open circuits)

With power off, connect one lead of **Self-Powered Test Light** or **Ohmmeter** to each end of circuit (Figure 3). Light will glow if circuit is closed. Switches and fuses can be checked in the same way.

VOLTAGE CHECK

Connect one lead of **Test Light** to a known good ground or the negative (-) battery terminal. Test for voltage by touching the other lead to the test point. Bulb goes on when the test point has voltage (Figure 4).

SHORT CHECK (short to ground)

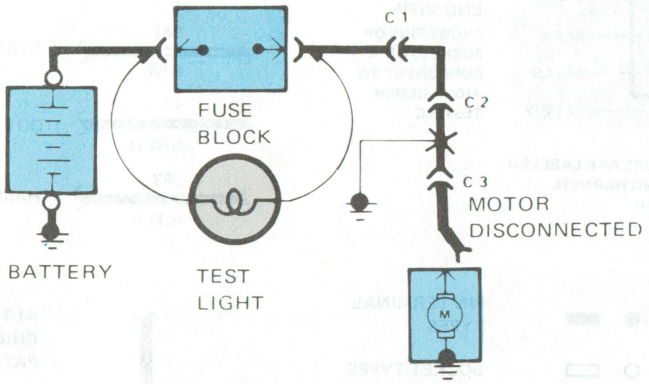


Figure 5— Short Check

A fuse that repeatedly blows is usually caused by a short to ground. It's important to be able to locate such a short quickly (Figure 5).

1) Turn off everything powered through the fuse.
2) Disconnect other loads powered through the fuse:
   - Motors: disconnect motor connector.
   - Lights: remove bulbs.
3) Turn **Ignition Switch** to RUN (if necessary) to power fuse.
4) Connect one **Test Light** lead to hot end of blown fuse. Connect other lead to ground. Bulb should glow showing power to fuse. *(This step is just a check to be sure you have power to the circuit.)*
5) Disconnect the **Test Light** lead from ground and reconnect it to the load side of the fuse.
   - If the **Test Light** is off, the short is in the disconnected equipment.
   - If the **Test Light** goes on, the short is in the wiring. You must find the short by disconnecting the circuit connectors one at a time until the **Test Light** goes out. For example: with a ground at X, the bulb goes out when C1 or C2 is disconnected, but stays on after disconnecting C3. This means the ground is between C2 and C3.

"GOOD GROUND" CHECK

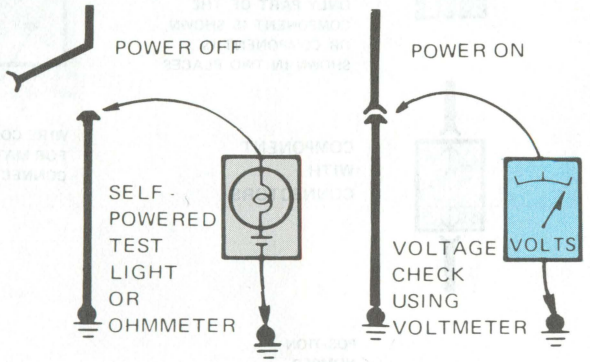


Figure 6 — Grounds Checks

Turn on power to circuit. Perform Voltage Check between suspected bad ground and frame. Any voltage means ground is bad.

Turn off power to circuit. Connect one lead of **Self-Powered Test Light** or **Ohmmeter** to wire in question, and the other to known ground. If bulb glows, circuit ground is OK (Figure 6).

TROUBLESHOOTING HINTS

The circuit schematics in this manual are designed to make it easy to identify common points in circuits. This knowledge can help narrow the problem to a specific area. For example, if several circuits fail at the same time, check for a common power or ground connection. (See *Power Distribution* or *Grounds).* If part of a circuit fails, check the connections between the part that works and the part that doesn't work.

For example, if low beam headlights work but high beams and the indicator light don't work, then power and ground paths must be good. Since the dimmer switch is the component which switches this power to the high beam lights and indicator, it is most likely the cause of failure.

4 ELECTRICAL SYMBOLS

DASHED COMPONENT BOX
ONLY PART OF THE COMPONENT IS SHOWN, OR COMPONENT IS SHOWN IN TWO PLACES

COMPONENT WITH CONNECTORS

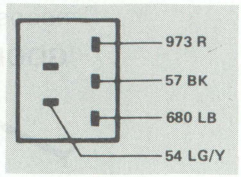
POSITION NUMBER
7
20A
FUSE
CURRENT RATING

POSITION NUMBER
2
20A
CIRCUIT BREAKER
CURRENT RATING

SCREW TERMINAL ON COMPONENT

SOLID STATE
SEALED ELECTRONIC COMPONENT
ANY CIRCUITRY SHOWN INSIDE THE BOX IS A FUNCTIONAL EQUIVALENT ONLY AND IS NOT EXACT

GAGE



COMPONENT CONNECTOR END VIEW
SHOWS PINS OR SOCKETS ON A COMPONENT TO AID IN BENCH TESTING

WIRE COLORS ARE LABELED FOR MATING HARNESS CONNECTOR

PIN TERMINAL TYPES

SOCKET TYPES

SOCKET
C100
IN–LINE CONNECTOR
PIN

S100
SPLICE OR CRIMP CONNECTION.
MOST ARE BUILT INTO HARNESS AND ARE NOT ACCESSIBLE.

GROUND CONNECTION

20 GA BLUE
FUSE LINK

63
R
SOLID WIRE

981
R/W
STRIPED WIRE

42
R/W D
DOTTED WIRE

383
R/W H
HASHED WIRE

AUTOMATIC TRANSMISSION
MANUAL TRANSMISSION
C305
ALTERNATE CIRCUIT PATHS

CANDELABRA CONNECTOR
ACCEPTS SINGLE-PIN CONNECTORS

JUNCTION BLOCK

RELAY
CONTACTS CLOSE WITH CURRENT THROUGH COIL

DASHED LINE SHOWS MECHANICAL CONNECTIONS

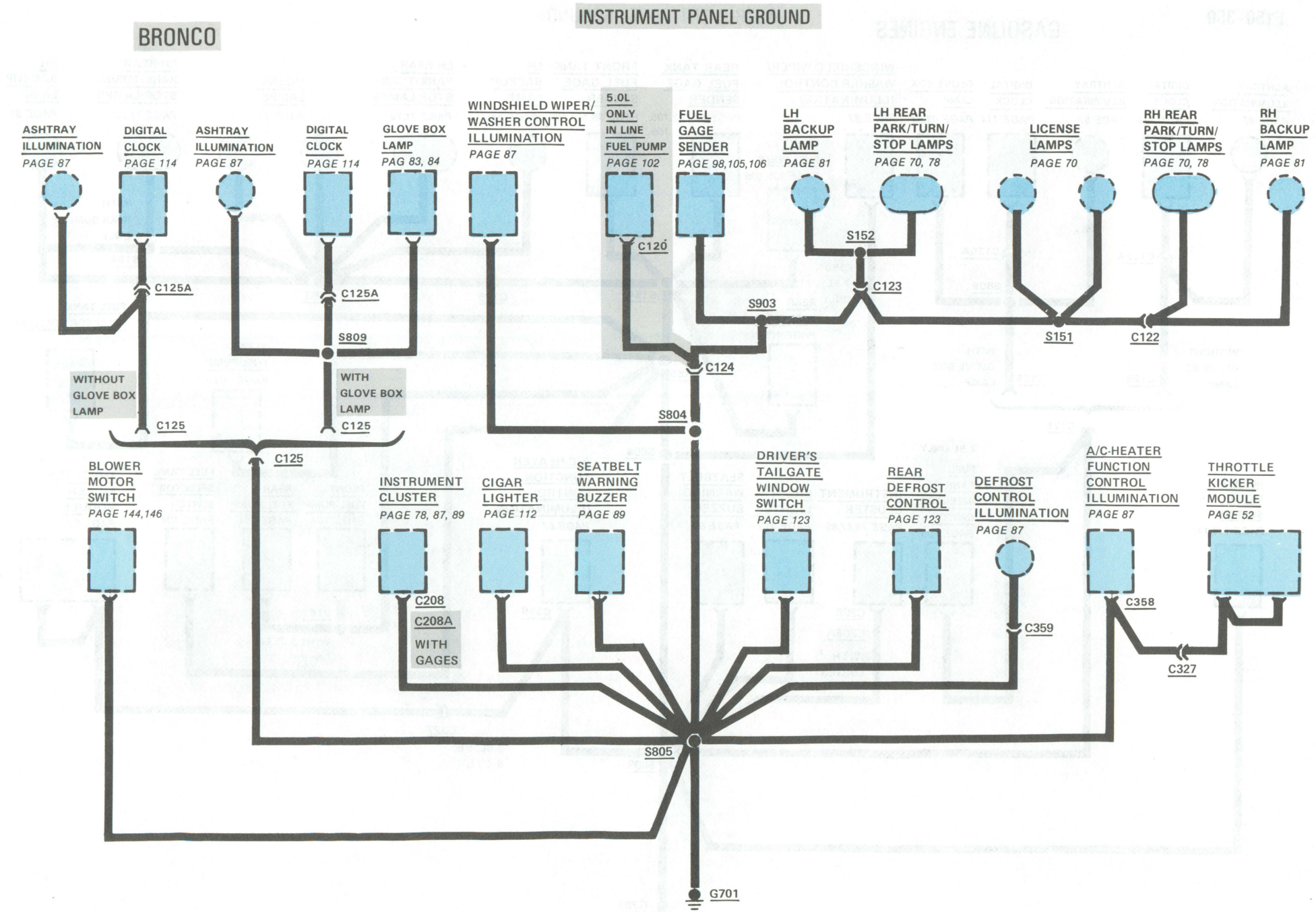
DIODES
CURRENT FLOWS IN DIRECTION OF ARROW ONLY

TRAILER ONLY
BR
C101A
W
W
C101
BR
OPTIONAL WIRING
BR WIRES (INCLUDING C101) ARE ON ALL VEHICLES, BUT W WIRES (INCLUDING C101A) ARE USED ONLY WITH TRAILER

FROM POWER
C
C
TO LOAD
"CUT" WIRES REFERENCED BETWEEN PAGES
ARROWS SHOW CURRENT FLOW FROM POWER TO GROUND

BACKUP LIGHTS
"REFERENCE" WIRES
COMPLETE WIRING SHOWN ON ANOTHER PAGE

SEE GROUNDS
PAGE 6, 7
DASHED WIRE
CIRCUITRY IS NOT SHOWN IN COMPLETE DETAIL, BUT IS COMPLETE ON ANOTHER PAGE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A/C-HEATER FUNCTION CONTROL ILLUMINATION
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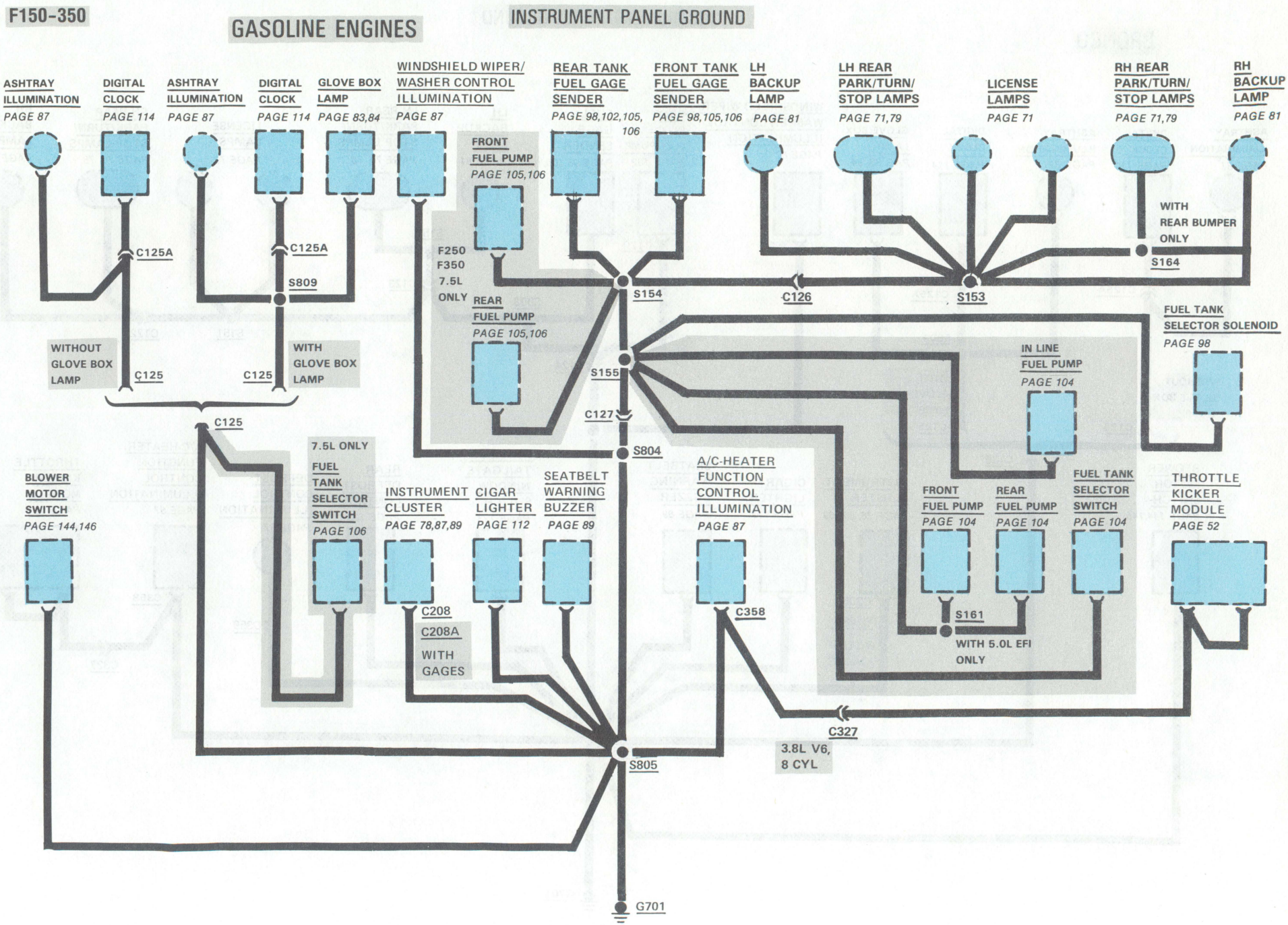
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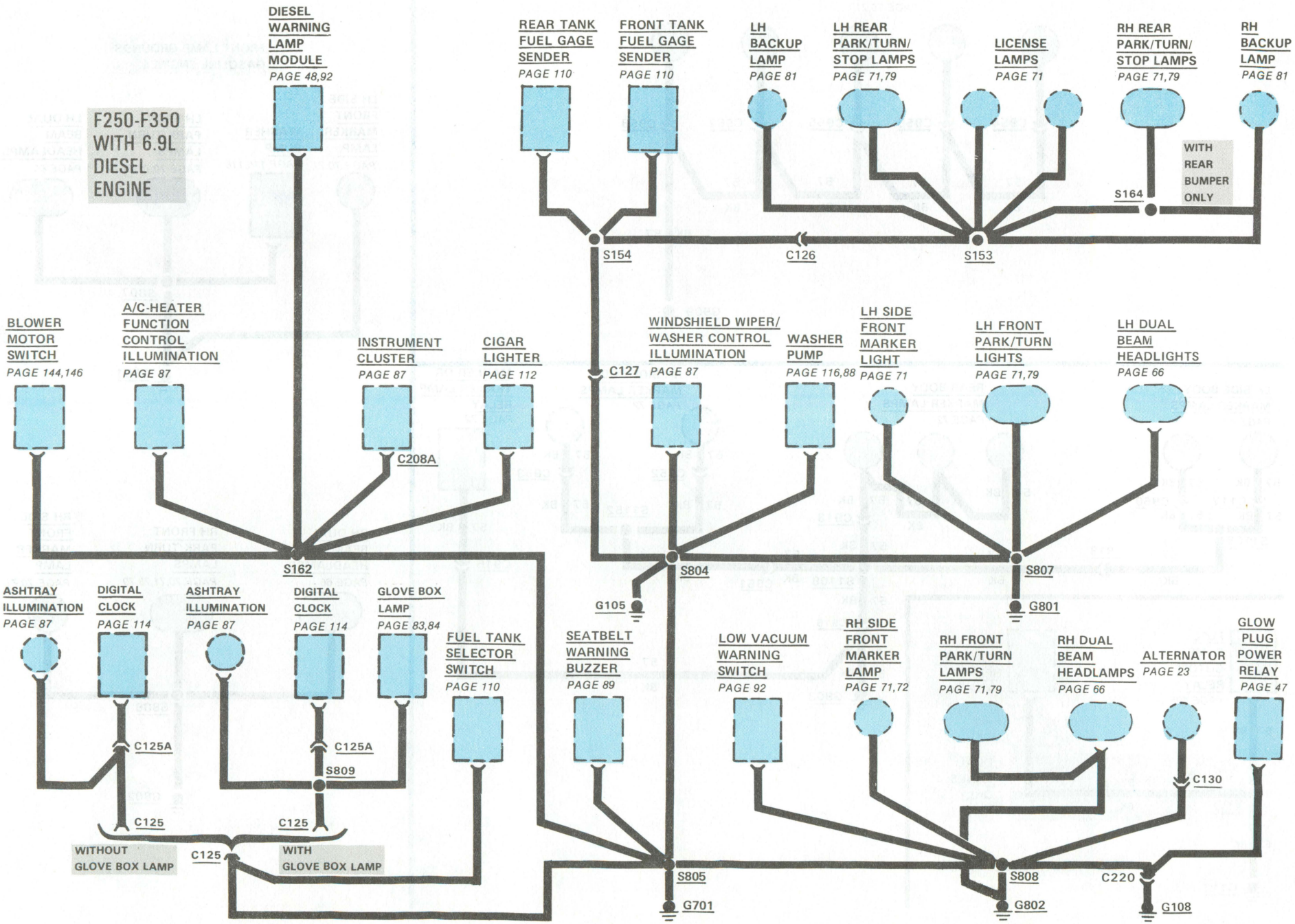
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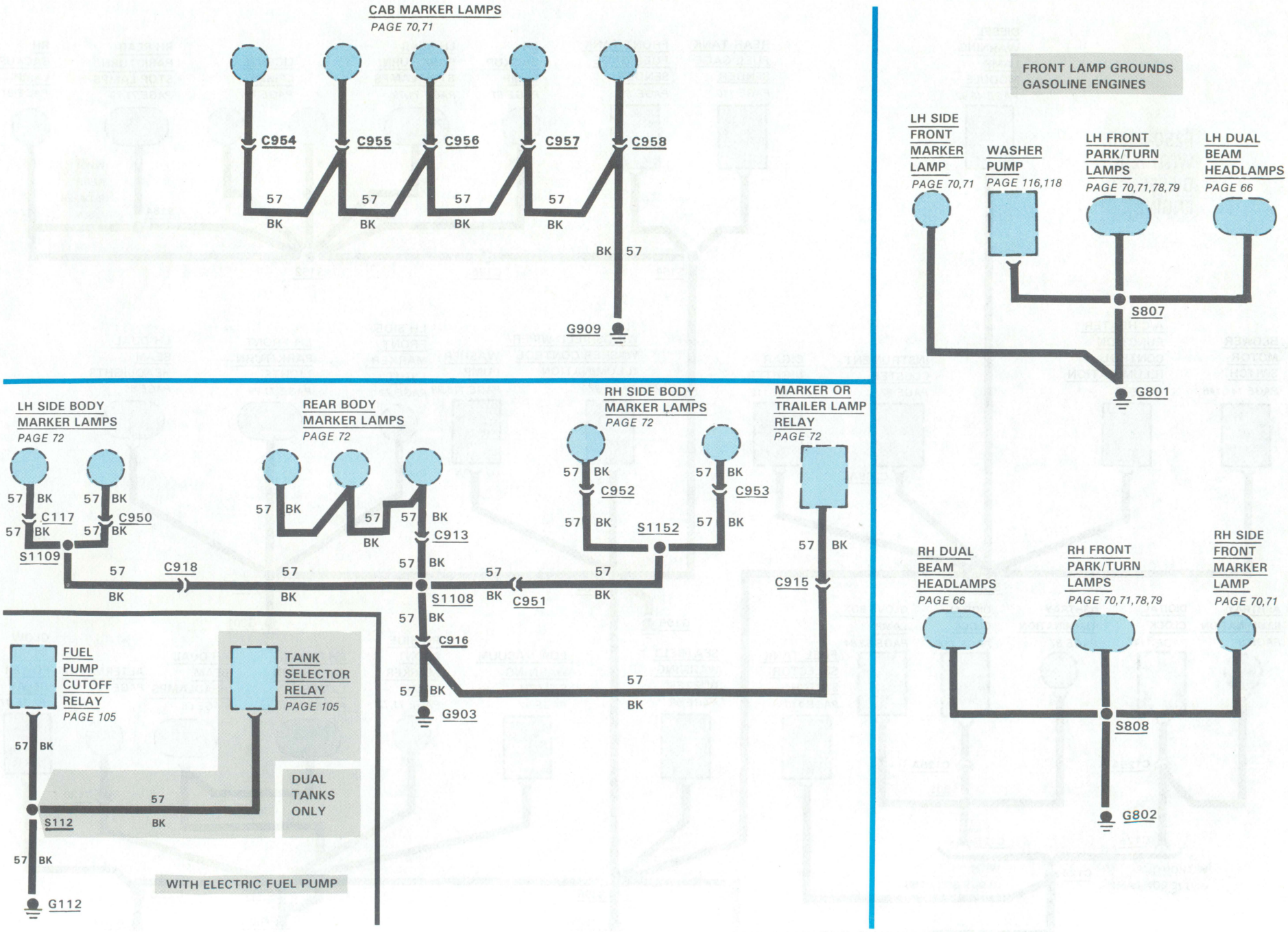

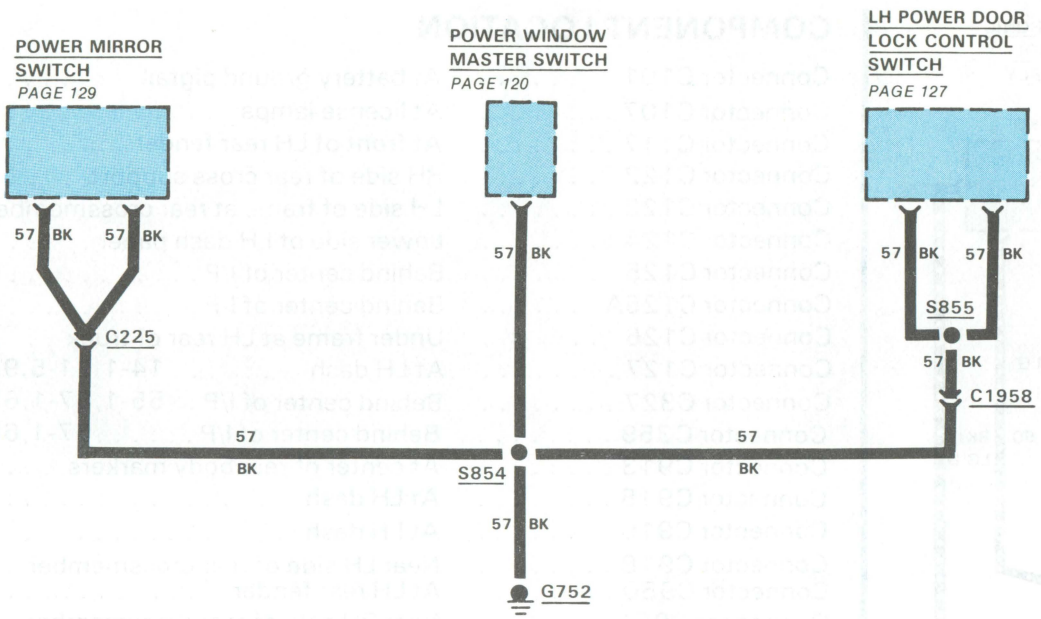
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POWER WINDOW MASTER SWITCH
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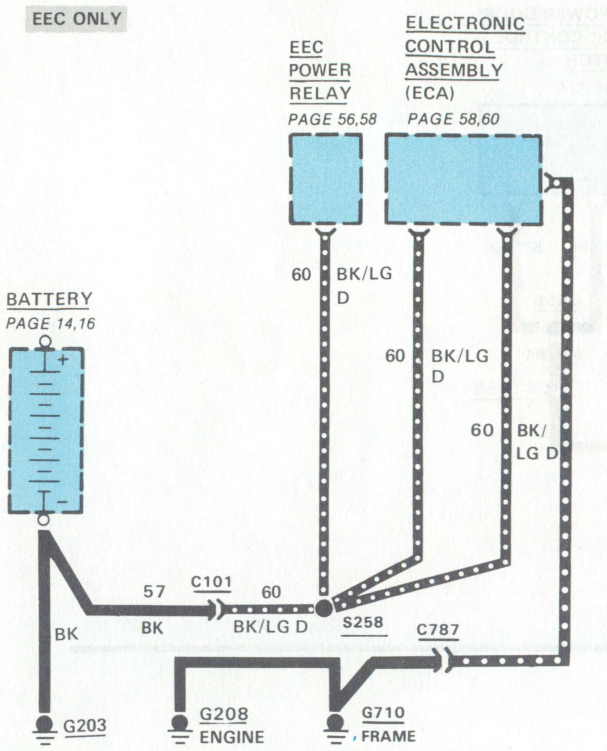
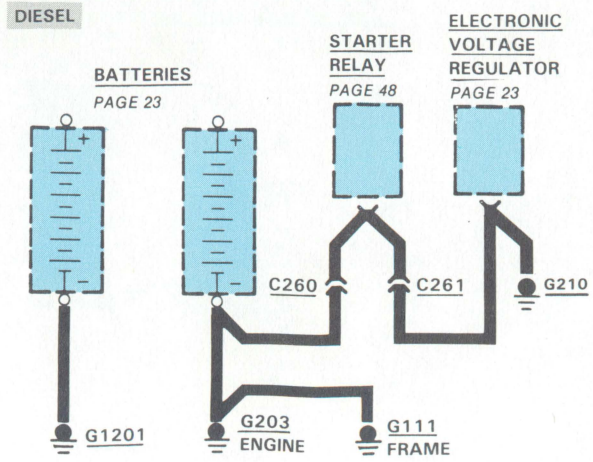
LH POWER DOOR LOCK CONTROL SWITCH
PAGE 127
57 BK
57 BK
C225
57 BK
57 BK
S855
57 BK
C1958
57 BK
57 BK
S854
57 BK
G752





COMPONENT LOCATION

		Page-Figure	Color	Terminals
Connector C101	At battery ground pigtail		GY	1
Connector C107	At license lamps	76-3	BR	1
Connector C117	At front of LH rear fender	76-2	BR	2
Connector C122	RH side of rear cross support	75-3	BK	4
Connector C123	LH side of frame at rear crossmember	125-3	NAT	4
Connector C124	Lower side of LH dash panel	21-5	BK	8
Connector C125	Behind center of I/P	67-1,68-1,69-1	GY	8
Connector C125A	Behind center of I/P	69-1,114-1	GY	8
Connector C126	Under frame at LH rear of truck	76-3	BR	1
Connector C127	At LH dash	14-1,21-5,95-1,97-1,116-1	GY	4
Connector C327	Behind center of I/P	55-1,67-1,69-1,96-1,125-2	GY	3
Connector C359	Behind center of I/P	67-1,69-1,96-1,125-2	GR	2
Connector C913	At center of rear body markers	75-2	GR	2
Connector C915	At LH dash	14-1,133-1	BK	2
Connector C916	At LH dash	76-3	BK	2
Connector C918	Near LH side of rear crossmember	76-3	GY	2
Connector C950	At LH rear fender	76-2	BR	2
Connec tor C951	Near RH side of rear crossmember	76-2	BR	2
Connector C952	At front of RH rear fender	76-2	BR	2
Connector C953	At rear of RH rear fender	76-2	BR	2
Connector C954	In forward part of roof cab	77-2	BK	2
Connector C955	In forward part of roof cab	77-2	BK	2
Connector C956	In forward part of roof cab	77-2	BK	2
Connector C957	In forward part of roof cab	77-2	BK	2
Connector C958	In forward part of roof cab	77-2	BK	2
Ground G108	At glow plug relay	22-1		
Ground G112	Near fuel pump cutoff relay	109-1		
Ground G203	RH side of engine	21-3,26-3,86-1		
Ground G210	At electronic voltage regulator	22-1		
Ground G105	At water in fuel switch (diesel)			
Ground G701	Behind I/P near RH side of radio	67-1,68-1,69-1,148-1		
Ground G752	LH Door rear power window motor	121-1		
Ground G801	On LH inner fender behind headlamps	66-1		
Ground G802	On RH inner fender behind headlamp	14-3,22-1		
Ground G903	At LH side of rear crossmember	76-3		
Ground G909	At lower LH cowl access hole	75-4		

(Continued on next page)

HOW THE CIRCUIT WORKS

The ground circuits shown here are complete and connect several components together to screw terminal ground points. On other pages only parts of these circuits may be shown. Partial ground circuits are shown dashed on those pages.

All simple or component ground circuits are shown on the individual circuit pages and are complete on those pages.

All ground wires are **57 BK** unless otherwise noted.

COMPONENT LOCATION *(Continued from previous page)*

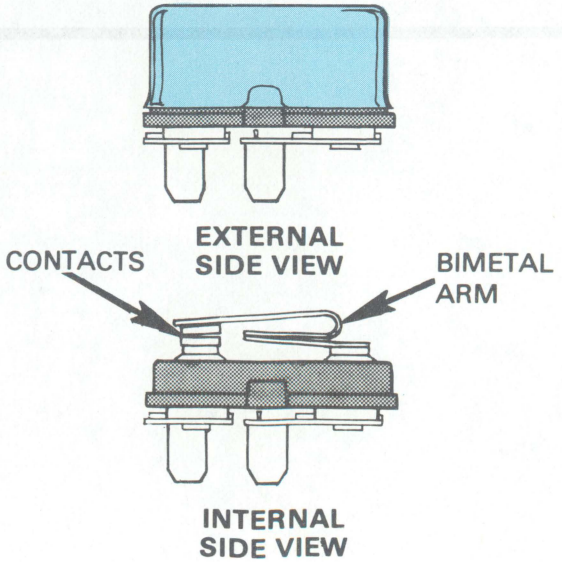
		Page-Figure	Color	Terminals
Splice S112	Near fuel pump cutoff relay T/O			
Splice S151	Near license plate T/O			
Splice S152	Near LH backup lamp T/O			
Splice S153	Near license plate T/O			
Splice S154	Near front fuel gage sender T/O			
Splice S155	Near fuel tank selector valve solenoid T/O			
Splice S161	Near front fuel pump T/O			
Splice S162	Near heater control switch T/O			
Splice S164	Near license plate T/O			
Splice S804	Near parking break switch T/O			
Splice S805	Near cigar lighter T/O			
Splice S807	Near LH front headlamp T/O			
Splice S808	Near RH park lamp T/O			
Splice S809	Near ashtray illumination T/O			
Splice S854	Near LH master window control T/O			
Splice S855	Near LH master window control T/O			
Splice S903	Near fuel gage sender and pump T/O			
Splice S1108	Near rear marker lamp T/O			
Splice S1109	Near LH front side marker lamp T/O			
Splice S1152	Near RH front side marker lamp T/O			

REPLACEMENT OF FUSES/ CIRCUIT BREAKERS

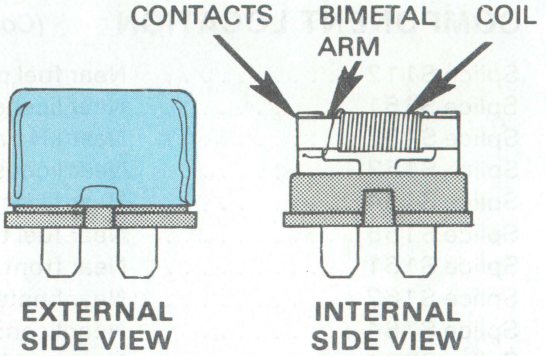
GOOD FUSE BLOWN FUSE

Fuses are mounted either in the **Fuse Panel** or in-line. They are identified by the numbered value in amperes, and by a color code. Some positions may have either a fuse with adapter or a circuit breaker. Be sure to replace a fuse or circuit breaker with the same kind of unit and with the same ampere rating. Remove fuses in order to check them.

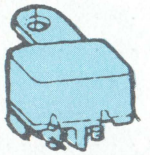
CIRCUIT BREAKER OPERATION



Cycling Fuse Block Type



Non-Cycling Fuse Block Type



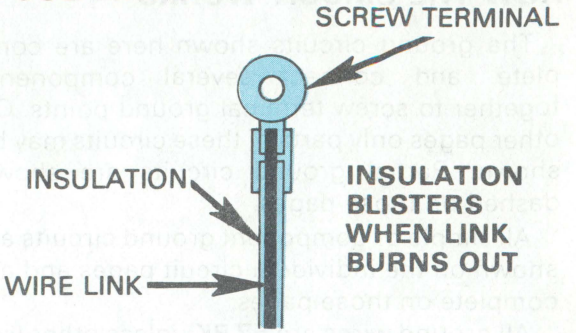
Cycling In-Line Type

Some circuits are protected by circuit breakers. (Abbreviated "c.b." in fuse chart.) They can be **Fuse Panel** mounted or in-line. Like fuses, they are rated in amperes.

Each circuit breaker conducts current through an arm made of two types of metal bonded together (bimetal arm). If the arm starts to carry too much current, it heats up. As one metal expands faster than the other, the arm bends, opening the contacts. Current flow is broken. In the cycling type, the arm cools and straightens out. This closes the circuit again. This cycle repeats as long as the overcurrent exists, with power applied.

In the non-cycling type, there is also a coil wrapped around the bimetal arm. When an overcurrent exists and the contacts open, a small current passes through the coil. This current through the coil is not large enough to operate a load, but it does heat up both the coil and bimetal arm. This keeps the arm in the open position until power is removed.

FUSE LINKS

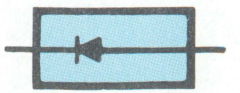


The fuse link is a short length of wire smaller in gage than the wire in the protected circuit. The wire is covered with a thick non-flammable insulation. An overload causes the link to heat and the insulation to blister. If the overload remains, the link will melt, causing an open circuit. The links are color coded for wire size as follows:

COLOR CODE	
BLUE	20 GA
RED	18 GA
ORANGE	16 GA
GREEN	14 GA

When replacing, make tight crimp joints or hot solder joints for good connections.

DIODES



Diodes are electrical devices that permit current to flow in one direction only. The current flows in the direction indicated by the arrow.

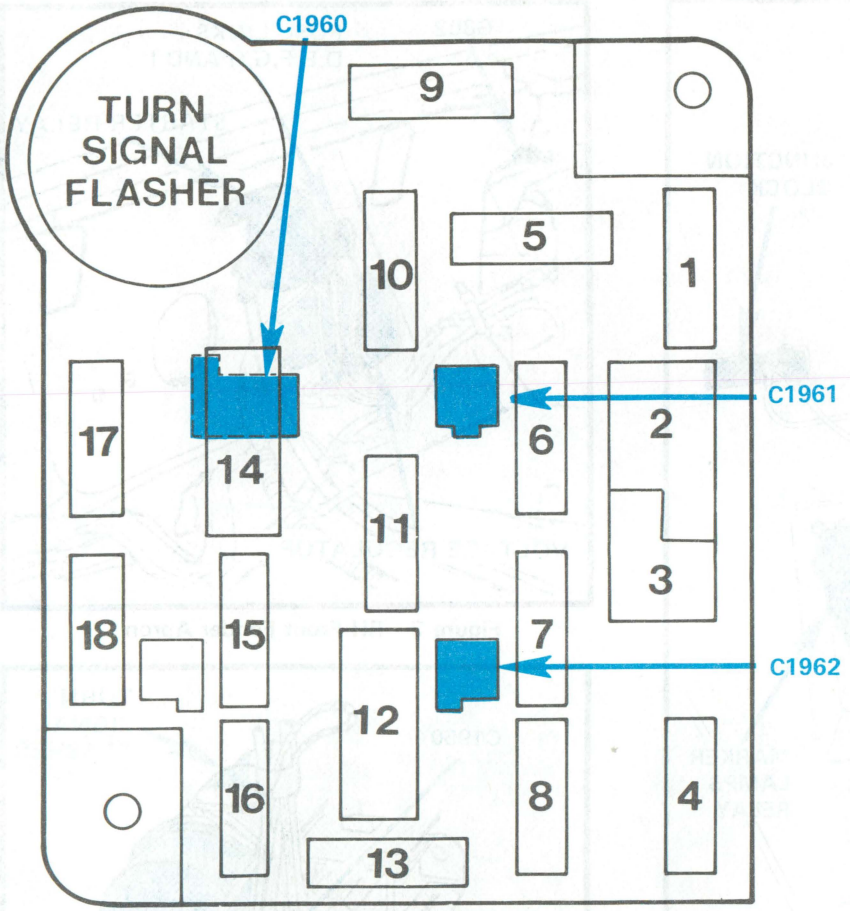


Figure 1 - Fuse Panel

Fuse Value Amps	Color Code
4	Pink
5	Tan
10	Red
15	Light Blue
20	Yellow
25	Natural
30	Light Green

Fuse Position	Amps	Circuits Protected
1	15	Stop/Hazard Lamps; Speed Control
2	--	(Not used)
3	--	(Not used)
4	15	Exterior Lamps; Instrument Illumination
5	15	Turn Lamps; Backup Lamps
6	15	Speed Control; 4-Wheel Drive Indicator; Auxiliary Battery Control; Digital Clock; Rear Window Defrost; Feedback Carburetor Control (4.9L)
7	--	(Not used)
8	15	Courtesy, Dome, Cargo Lamps; Warning Buzzer
9	30	Heater; A/C-Heater
10	--	(Not used)
11	15	Radio
12	25 30 c.b.	Tailgate Power Window; Power Mirrors Power Door Locks
13	--	(Not used)
14	25 20 c.b.	Tailgate Power Window Power Windows
15	10	Auxiliary Fuel Tank Selector
16	20	Horn; Cigar Lighter
17	5	Instrument Illumination, Digital Clock
18	15	Seatbelt Buzzer; Warning Indicators; EEC; Carburetor Circuits; Tachometer; Choke Heater; Diesel Glow Plug Control; Diesel Indicators; Electric Fuel Pump Control (7.5L);

Power Distribution

The **Alternator** and **Battery** are connected together at the **Starter Relay** hot terminal. Other circuits originate at the **Starter Relay** hot terminal and are protected by fuse links. Low power circuits are also protected by fuses.

The **Ignition Switch** and **Main Light Switch** are powered at all times as are **Fuses 1, 4, 8, 12,** and **16.** The other fuses are powered through the **Ignition Switch** or the Main Light Switch.

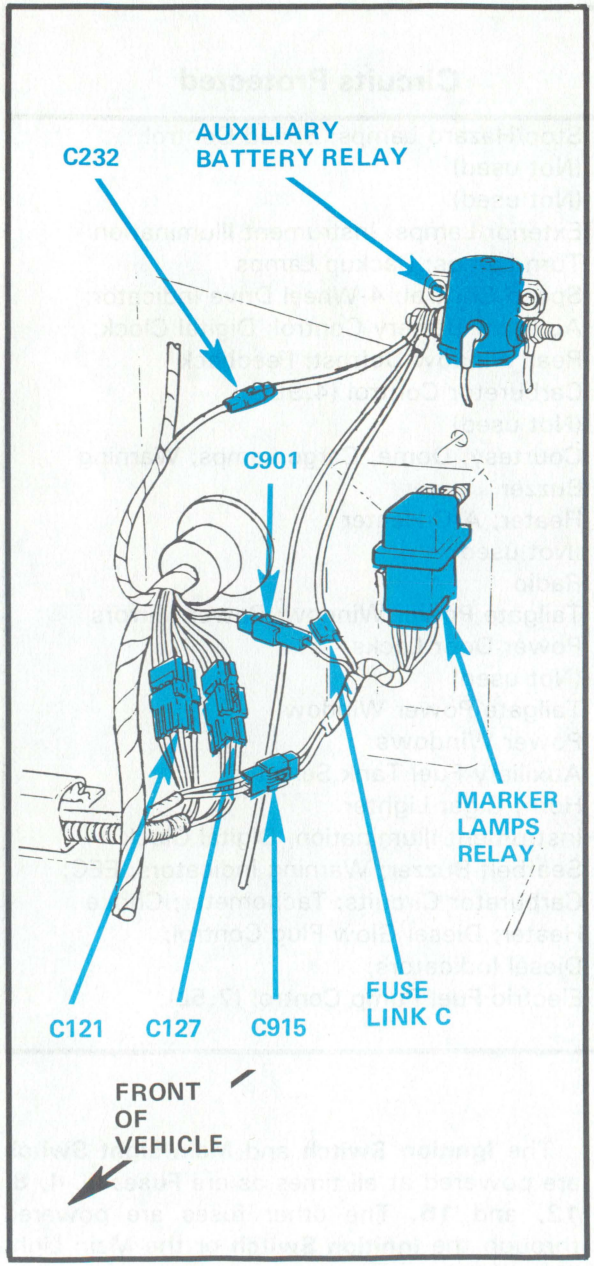


Figure 1 - LH Dash Panel For Dual Rear Wheels And Dual Batteries

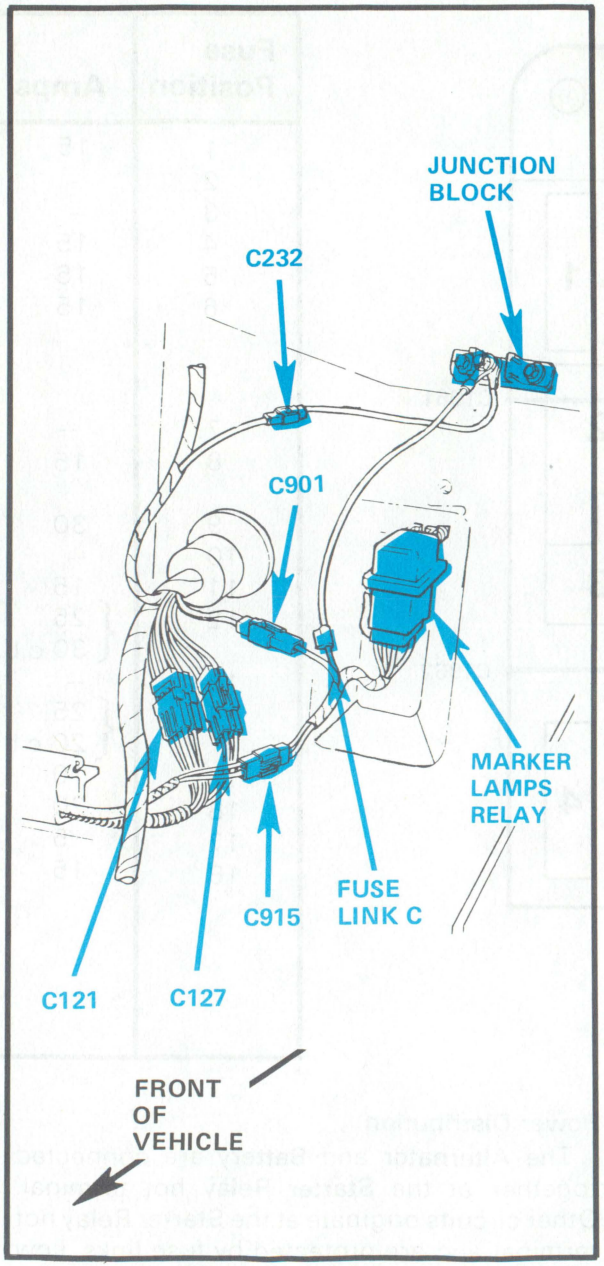


Figure 2 - LH Dash Panel For Dual Rear Wheels Without Dual Batteries

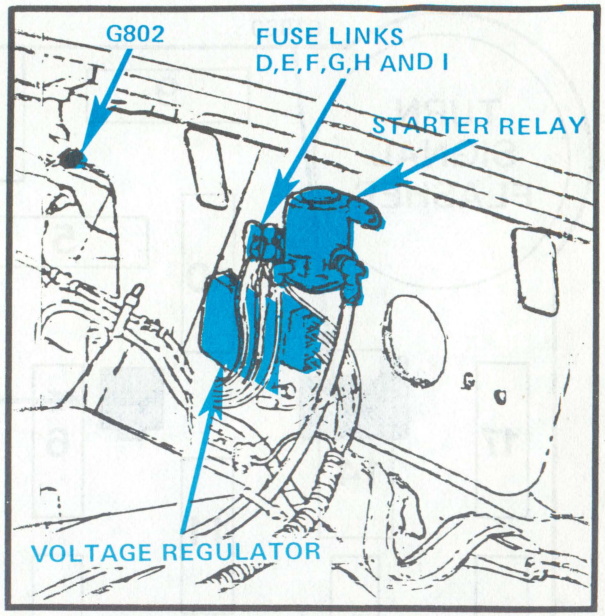


Figure 3 - RH Front Fender Apron

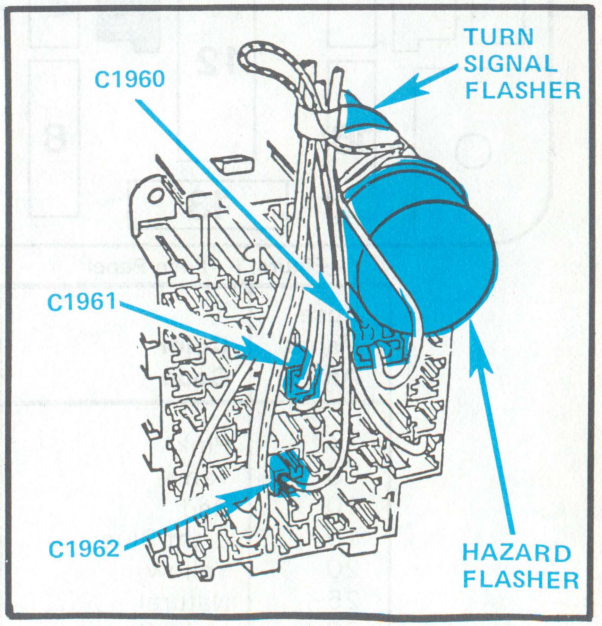
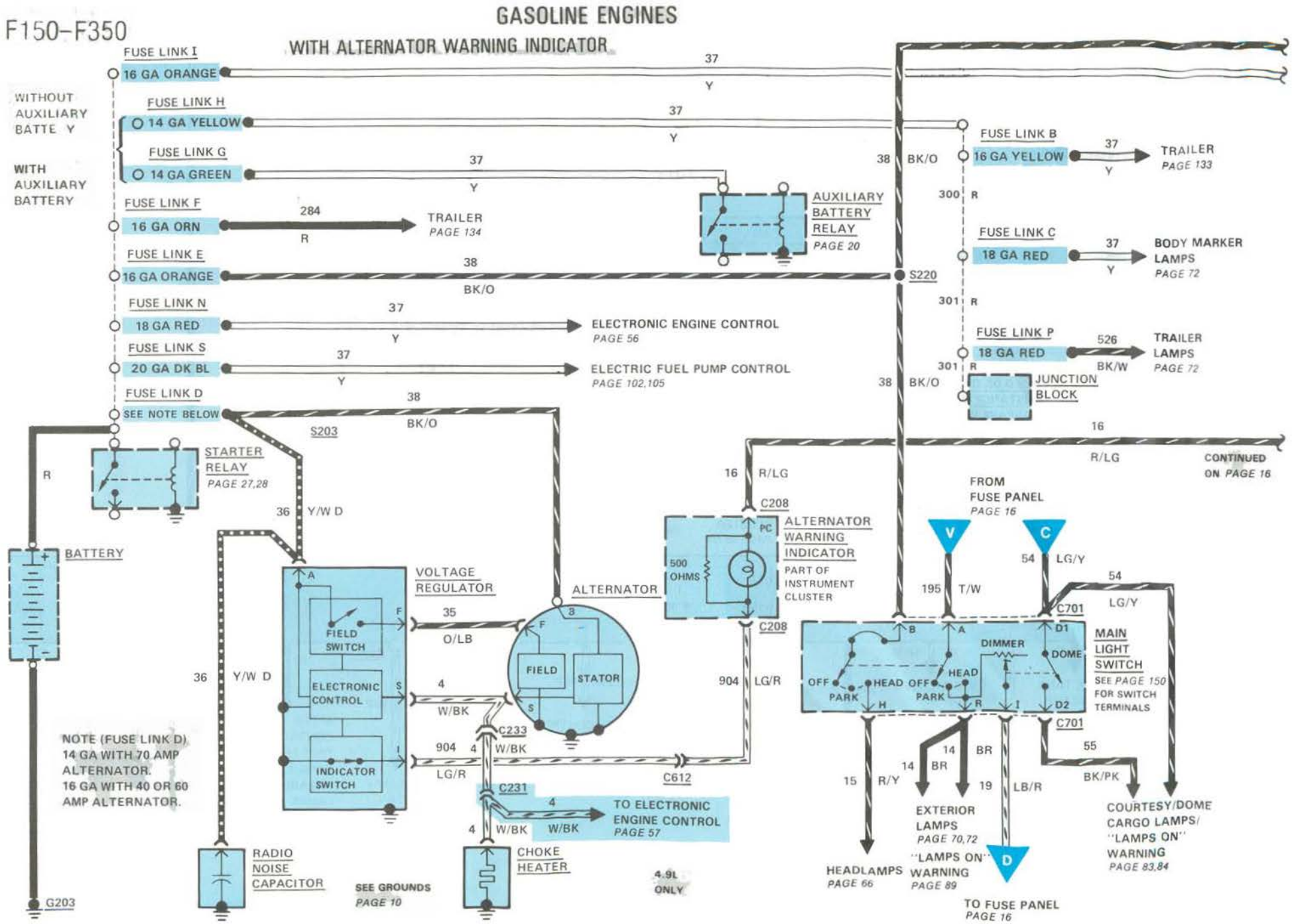
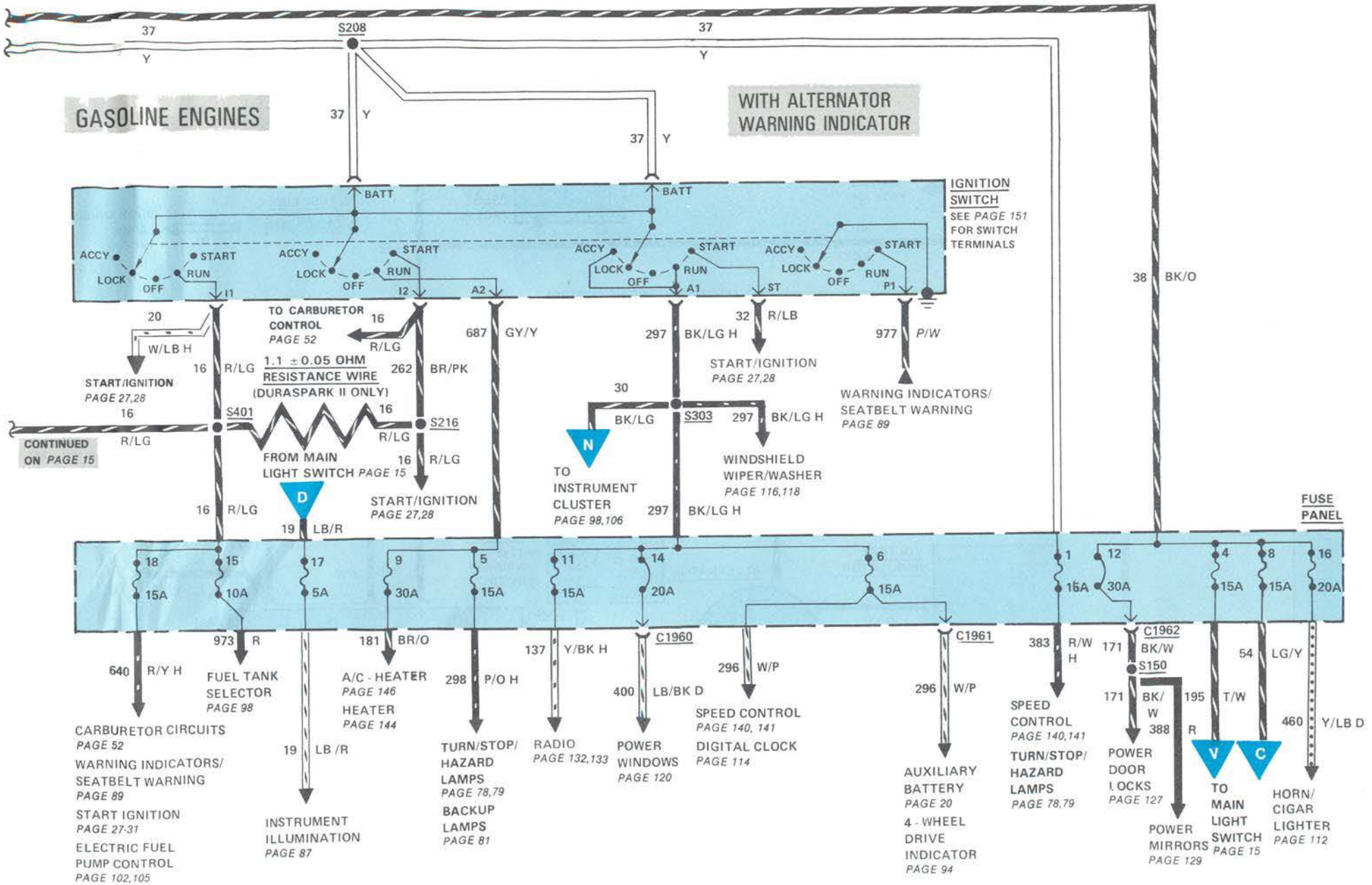
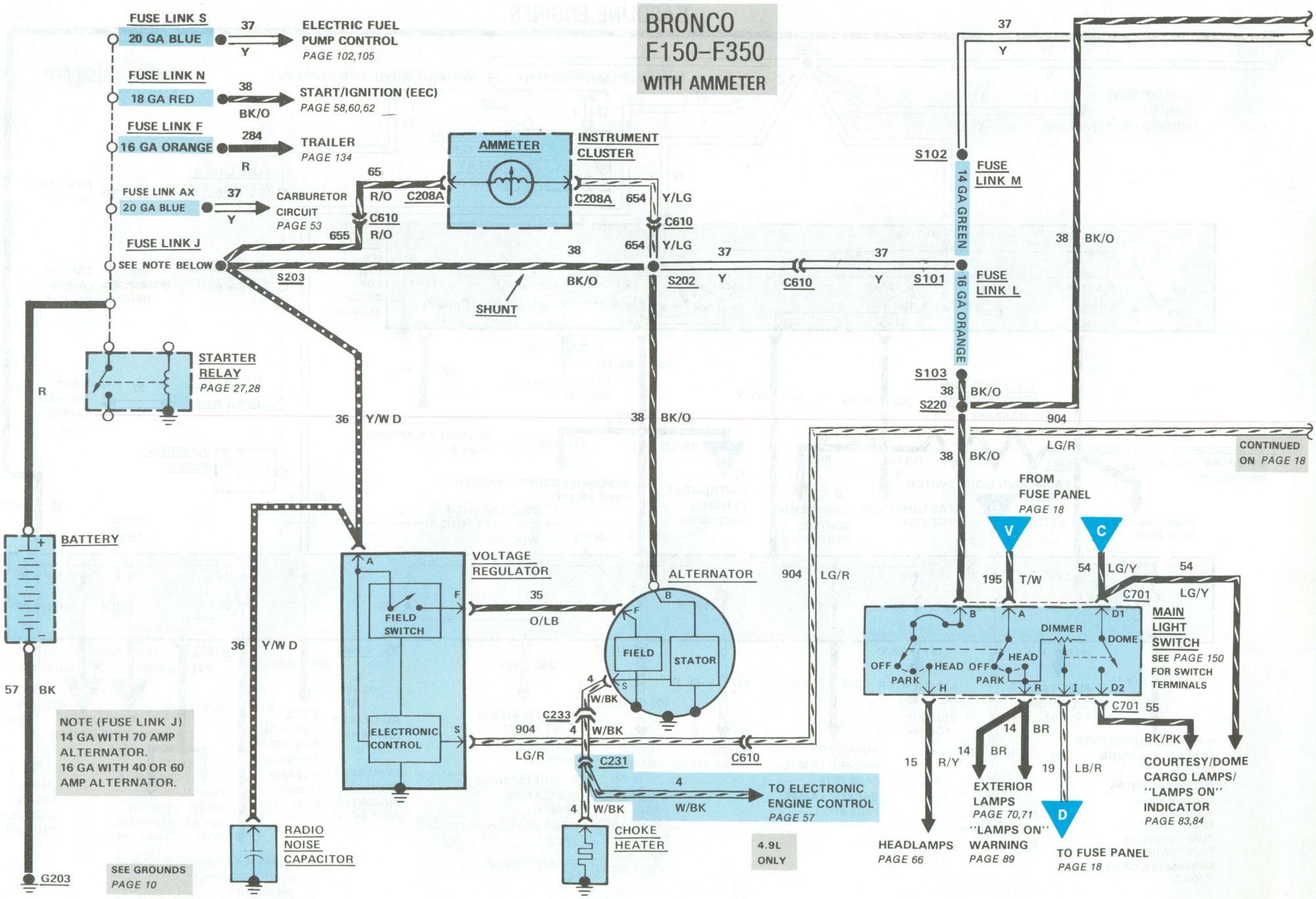


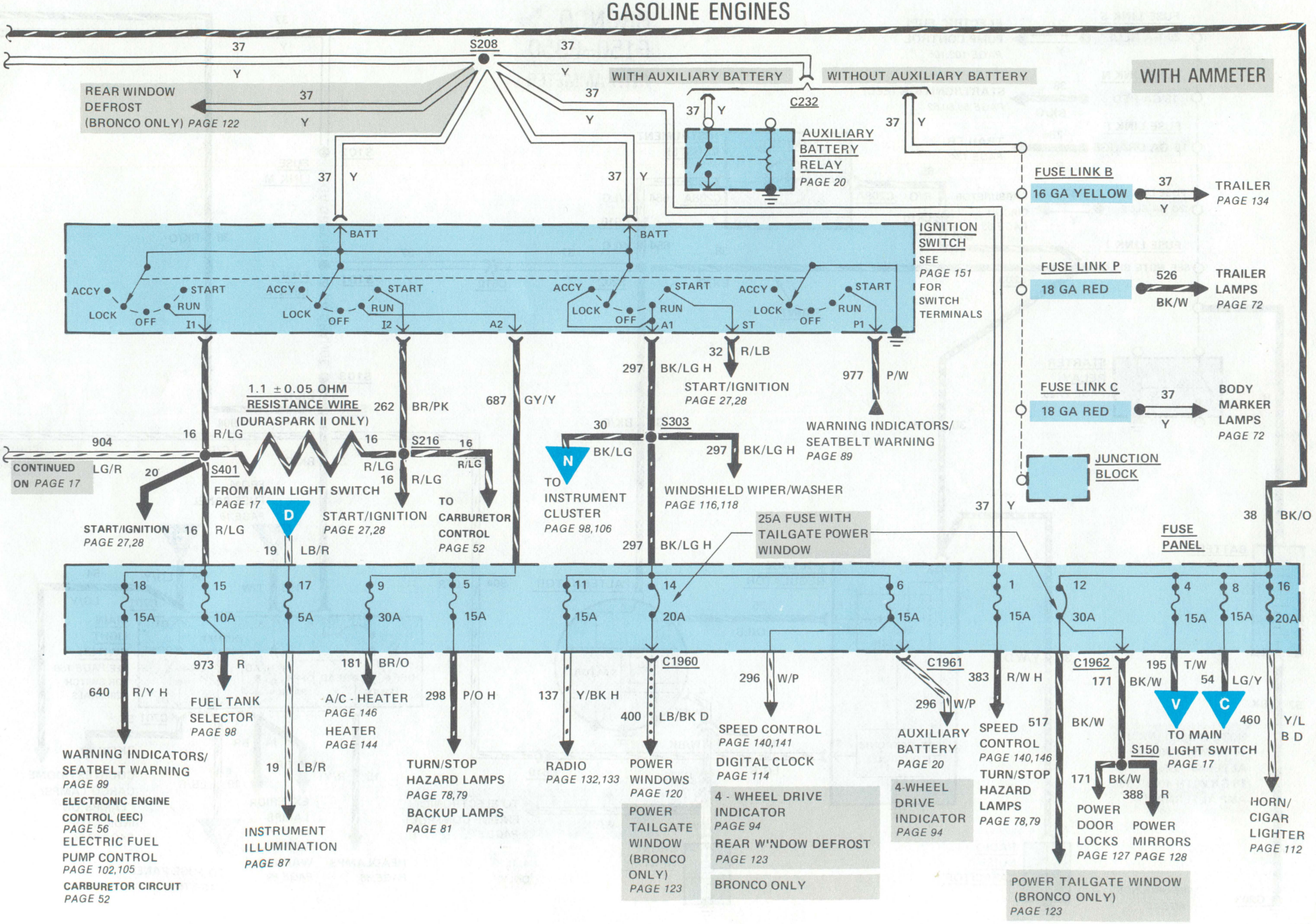
Figure 4 - Behind LH I/P, Rear Of Fuse Panel


F150-F350
GASOLINE ENGINES
WITH ALTERNATOR WARNING INDICATOR
WITHOUT AUXILIARY BATTE Y
WITH AUXILIARY BATTERY
FUSE LINK I
16 GA ORANGE
37
Y
FUSE LINK H
14 GA YELLOW
FUSE LINK G
14 GA GREEN
FUSE LINK F
16 GA ORN
284
R
TRAILER
PAGE 134
AUXILIARY BATTERY RELAY
PAGE 20
FUSE LINK E
16 GA ORANGE
38
BK/O
S220
FUSE LINK N
18 GA RED
ELECTRONIC ENGINE CONTROL
PAGE 56
FUSE LINK S
20 GA DK BL
ELECTRIC FUEL PUMP CONTROL
PAGE 102,105
FUSE LINK D
SEE NOTE BELOW
S203
STARTER RELAY
PAGE 27,28
BATTERY
G203
36 Y/W D
VOLTAGE REGULATOR
FIELD SWITCH
ELECTRONIC CONTROL
INDICATOR SWITCH
35
O/LB
4
W/BK
904
LG/R
C233
C231
C612
ALTERNATOR
FIELD
STATOR
TO ELECTRONIC ENGINE CONTROL
PAGE 57
CHOKE HEATER
4.9L ONLY
RADIO NOISE CAPACITOR
SEE GROUNDS
PAGE 10
NOTE (FUSE LINK D)
14 GA WITH 70 AMP ALTERNATOR.
16 GA WITH 40 OR 60 AMP ALTERNATOR.
16 R/LG
C208
ALTERNATOR WARNING INDICATOR
PART OF INSTRUMENT CLUSTER
500 OHMS
FUSE LINK B
16 GA YELLOW
TRAILER
PAGE 133
300 R
FUSE LINK C
18 GA RED
BODY MARKER LAMPS
PAGE 72
301 R
FUSE LINK P
18 GA RED
526
BK/W
TRAILER LAMPS
PAGE 72
JUNCTION BLOCK
CONTINUED ON PAGE 16
FROM FUSE PANEL
PAGE 16
195 T/W
54 LG/Y
MAIN LIGHT SWITCH
SEE PAGE 150 FOR SWITCH TERMINALS
DIMMER
DOME
OFF
PARK
HEAD
C701
55
BK/PK
15 R/Y
14 BR
19 LB/R
EXTERIOR LAMPS
PAGE 70,72
"LAMPS ON" WARNING
PAGE 89
HEADLAMPS
PAGE 66
TO FUSE PANEL
PAGE 16
COURTESY/DOME CARGO LAMPS/ "LAMPS ON" WARNING
PAGE 83,84

16 CHARGE/POWER DISTRIBUTION (WITH ALTERNATOR WARNING INDICATOR) (GAS)




BRONCO
F150-F350
WITH AMMETER
FUSE LINK S
20 GA BLUE
37
Y
ELECTRIC FUEL PUMP CONTROL
PAGE 102,105
FUSE LINK N
18 GA RED
38
BK/O
START/IGNITION (EEC)
PAGE 58,60,62
FUSE LINK F
16 GA ORANGE
284
R
TRAILER
PAGE 134
FUSE LINK AX
20 GA BLUE
37
Y
CARBURETOR CIRCUIT
PAGE 53
FUSE LINK J
SEE NOTE BELOW
AMMETER
INSTRUMENT CLUSTER
65
R/O
C208A
C610
655
R/O
C208A
654
Y/LG
C610
654
Y/LG
S203
38
BK/O
SHUNT
S202
37
Y
C610
37
Y
S101
S102
14 GA GREEN
FUSE LINK M
37
Y
38
BK/O
S103
16 GA ORANGE
FUSE LINK L
38
BK/O
S220
904
LG/R
CONTINUED ON PAGE 18
38
BK/O
FROM FUSE PANEL
PAGE 18
STARTER RELAY
PAGE 27,28
R
36
Y/W D
38
BK/O
BATTERY
57
BK
G203
SEE GROUNDS
PAGE 10
NOTE (FUSE LINK J)
14 GA WITH 70 AMP ALTERNATOR.
16 GA WITH 40 OR 60 AMP ALTERNATOR.
VOLTAGE REGULATOR
A
F
S
FIELD SWITCH
ELECTRONIC CONTROL
35
O/LB
ALTERNATOR
B
F
FIELD
STATOR
S
4
W/BK
C233
904
4
W/BK
LG/R
C231
C610
4
W/BK
4
W/BK
TO ELECTRONIC ENGINE CONTROL
PAGE 57
36
Y/W D
RADIO NOISE CAPACITOR
CHOKE HEATER
4.9L ONLY
904
LG/R
V
C
195
T/W
54
LG/Y
54
LG/Y
C701
MAIN LIGHT SWITCH
SEE PAGE 150 FOR SWITCH TERMINALS
B
A
D1
DIMMER
DOME
D2
OFF
HEAD
PARK
H
R
I
C701
55
BK/PK
COURTESY/DOME CARGO LAMPS/ "LAMPS ON" INDICATOR
PAGE 83,84
15
R/Y
14
BR
14
BR
19
LB/R
EXTERIOR LAMPS
PAGE 70,71
"LAMPS ON" WARNING
PAGE 89
D
TO FUSE PANEL
PAGE 18
HEADLAMPS
PAGE 66


GASOLINE ENGINES
WITH AMMETER
WITH AUXILIARY BATTERY
WITHOUT AUXILIARY BATTERY
S208
C232
AUXILIARY BATTERY RELAY
PAGE 20
REAR WINDOW DEFROST (BRONCO ONLY) PAGE 122
FUSE LINK B
16 GA YELLOW
TRAILER
PAGE 134
FUSE LINK P
18 GA RED
TRAILER LAMPS
PAGE 72
FUSE LINK C
18 GA RED
BODY MARKER LAMPS
PAGE 72
JUNCTION BLOCK
IGNITION SWITCH
SEE PAGE 151 FOR SWITCH TERMINALS
BATT
ACCY
START
LOCK
OFF
RUN
I1
I2
A2
A1
ST
P1
1.1 ±0.05 OHM RESISTANCE WIRE (DURASPARK II ONLY)
START/IGNITION PAGE 27,28
WARNING INDICATORS/ SEATBELT WARNING PAGE 89
WINDSHIELD WIPER/WASHER PAGE 116,118
TO INSTRUMENT CLUSTER PAGE 98,106
FROM MAIN LIGHT SWITCH PAGE 17
TO CARBURETOR CONTROL PAGE 52
CONTINUED ON PAGE 17
S401
S216
S303
25A FUSE WITH TAILGATE POWER WINDOW
FUSE PANEL
WARNING INDICATORS/ SEATBELT WARNING PAGE 89
ELECTRONIC ENGINE CONTROL (EEC) PAGE 56
ELECTRIC FUEL PUMP CONTROL PAGE 102,105
CARBURETOR CIRCUIT PAGE 52
FUEL TANK SELECTOR PAGE 98
INSTRUMENT ILLUMINATION PAGE 87
A/C - HEATER PAGE 146
HEATER PAGE 144
TURN/STOP HAZARD LAMPS PAGE 78,79
BACKUP LAMPS PAGE 81
RADIO PAGE 132,133
POWER WINDOWS PAGE 120
POWER TAILGATE WINDOW (BRONCO ONLY) PAGE 123
SPEED CONTROL PAGE 140,141
DIGITAL CLOCK PAGE 114
4 - WHEEL DRIVE INDICATOR PAGE 94
REAR WINDOW DEFROST PAGE 123
BRONCO ONLY
AUXILIARY BATTERY PAGE 20
4-WHEEL DRIVE INDICATOR PAGE 94
SPEED CONTROL PAGE 140,146
TURN/STOP HAZARD LAMPS PAGE 78,79
POWER TAILGATE WINDOW (BRONCO ONLY) PAGE 123
POWER DOOR LOCKS PAGE 127
POWER MIRRORS PAGE 128
TO MAIN LIGHT SWITCH PAGE 17
HORN/ CIGAR LIGHTER PAGE 112
C1960
C1961
C1962
S150

HOW THE CIRCUIT WORKS

When an **Auxiliary Battery** is used, it is connected in parallel with the main **Battery** through **Fuse Links G** or **M**. When the **Ignition Switch** is in OFF, the **Auxiliary Battery Relay** is de-energized, and **Camper** and **Trailer** circuits are powered only from the **Auxiliary Battery**. This prevents discharging the main **Battery** when only the **Camper** or **Trailer** is being used.

The **Battery, Alternator** and **Voltage Regulator** make up the **Charging System.**

With Alternator Warning Indicator

With the **Ignition Switch** in RUN, **Battery** current flows through the **Alternator Warning Indicator** into the regulator at terminal I and to ground through the solid-state indicator switch. The electronic control measures a low voltage at regulator terminal A and closes the field switch. This applies battery voltage to the field through **Alternator** terminal F.

With current in the field and the rotor turning, the **Alternator** stator produces a DC voltage at terminal B (to **Battery**) and terminal S. (Voltage at S is one-half voltage at B.)

A pre-set voltage at terminal S operates the electronic control to open the indicator switch which removes ground from the **Alternator Warning Indicator.**

The **Alternator** output is controlled by the current in the field. The average voltage on the field depends on the percentage of time the field switch is closed. The electronic control closes the field switch when the voltage at A is low, and opens the switch when the voltage at A is high.

The **Voltage Regulator** holds the system voltage at about 14 volts. The average **Alternator** output is then any required value between zero and full current depending on conditions sensed by the **Voltage Regulator.**

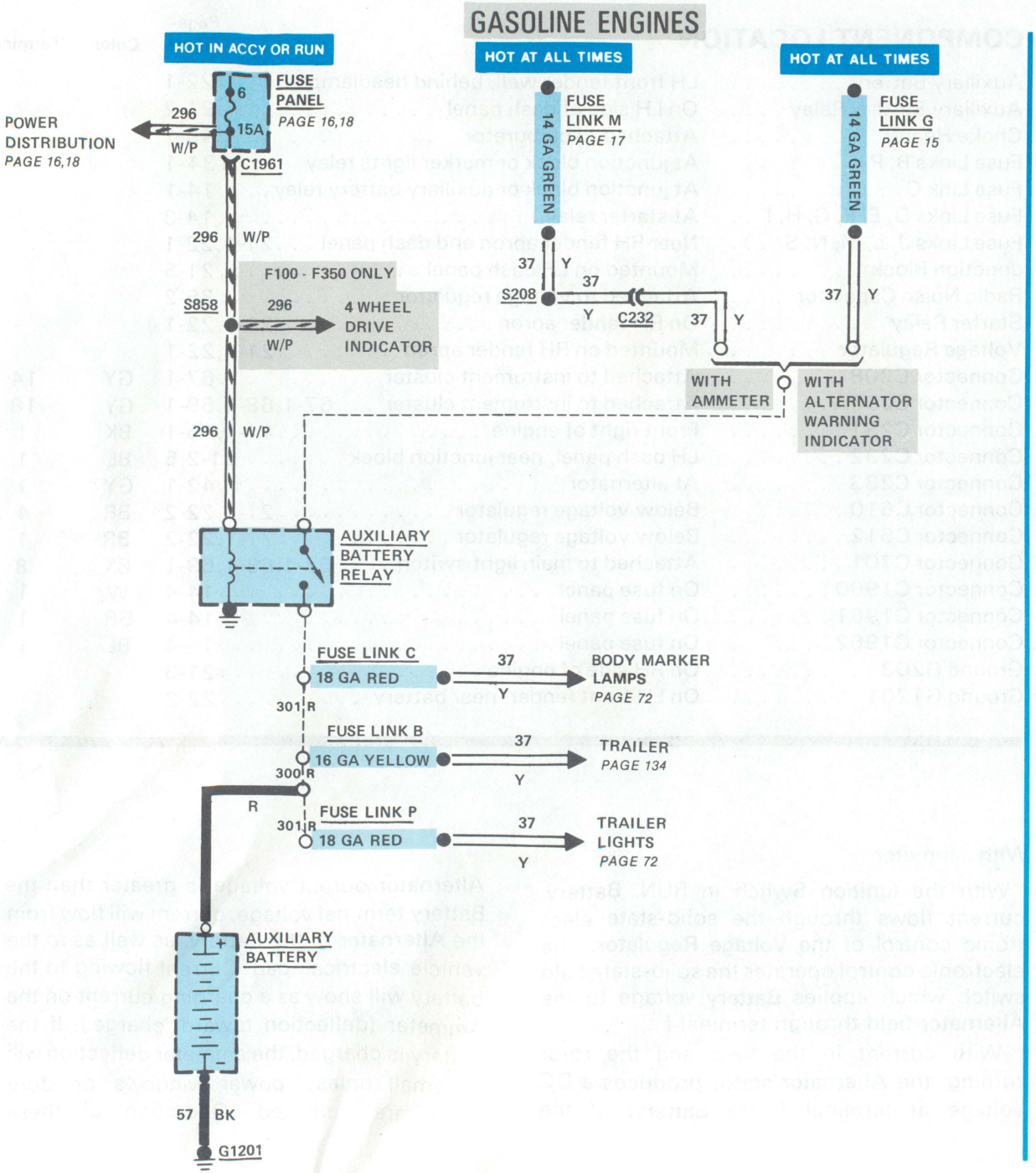
COMPONENT LOCATION

		Page-Figure	Color	Terminals
Auxiliary Battery	LH front fender well, behind headlamps	22-1		
Auxiliary Battery Relay	On LH side of dash panel	21-2		
Choke Heater	Attached to carburetor	45-1		
Fuse Links B, P	At junction block or marker lights relay	134-1		
Fuse Link C	At junction block or auxiliary battery relay	14-1		
Fuse Links D, E, F, G, H, I	At starter relay	14-3		
Fuse Links J, L, M, N, S	Near RH fender apron and dash panel	21-1,22-1		
Junction Block	Mounted on LH dash panel	21-5		
Radio Noise Capacitor	Attached to voltage regulator	36-2		
Starter Relay	On RH fender apron	21-1,22-1		
Voltage Regulator	Mounted on RH fender apron	21-1,22-1		
Connector C208	Attached to instrument cluster	67-1	GY	14
Connector C208A	Attached to instrument cluster	67-1,68-1,69-1	GY	18
Connector C231	Front right of engine	14-1,45-1	BK	1
Connector C232	LH dash panel, near junction block	21-2,5	BL	1
Connector C233	At alternator	42-1	GY	1
Connector C610	Below voltage regulator	21-1,22-2	BR	4
Connector C612	Below voltage regulator	21-1,22-2	BR	1
Connector C701	Attached to main light switch	67-1,68-1,69-1	BK	8
Connector C1960	On fuse panel	14-4	W	1
Connector C1961	On fuse panel	14-4	GR	1
Connector C1962	On fuse panel	14-4	BL	1
Ground G203	On RH side of engine	21-3		
Ground G1201	On LH front fender, near battery	22-2		

With Ammeter

With the **Ignition Switch** in RUN, **Battery** current flows through the solid-state electronic control of the **Voltage Regulator.** The electronic control operates the solid-state field switch which applies **Battery** voltage to the **Alternator** field through terminal F.

With current in the field and the rotor turning, the **Alternator** stator produces a DC voltage at terminal B (to **Battery**). If the **Alternator** output voltage is greater than the **Battery** terminal voltage, current will flow from the **Alternator** *to* the **Battery**, as well as *to* the vehicle electrical load. Current flowing to the battery will show as a charging current on the **Ammeter** (deflection toward 'charge'). If the battery is charged, the ammeter deflection will be small unless power windows or door locks are activated. Operation of these



intermittent devices will give a charge indication on the **Ammeter**.

If the **Alternator** voltage is less than the **Battery** terminal voltage, current will flow *from* the **Battery** to supplement the alternator output in supplying the vehicle electrical load. This current flow will register as a 'discharge' on the **Ammeter**. The **Choke Heater** operates only when the **Alternator** is generating current (through terminal S). Above 60°F, the heater causes a thermostatic spring to pull the choke plates open within 1 to 1.5 minutes. Below 60°F, the heater does not operate and normal choke action occurs.

> NOTE
> The Voltage Regulator with BLACK printing on the cover is used with Alternator Warning Indicator;
> BLUE printing with Ammeter;
> RED printing with either.

TROUBLESHOOTING HINTS

The most common charge system complaints are dead **Battery** and **Ammeter** discharging (or **Alternator Warning Indicator** on at normal speed).

- Check **Fuse Link J** (Ammeter) or **Fuse Link D** (Indicator) at **Starter Relay**.
- Check **Alternator** belt tension.
- Check **Battery** terminals and cable clamps.
- Check for clean and tight connections on **Alternator, Regulator,** and **Starter Relay**.
- Read "Charging System Diagnosis" in the Shop Manual.

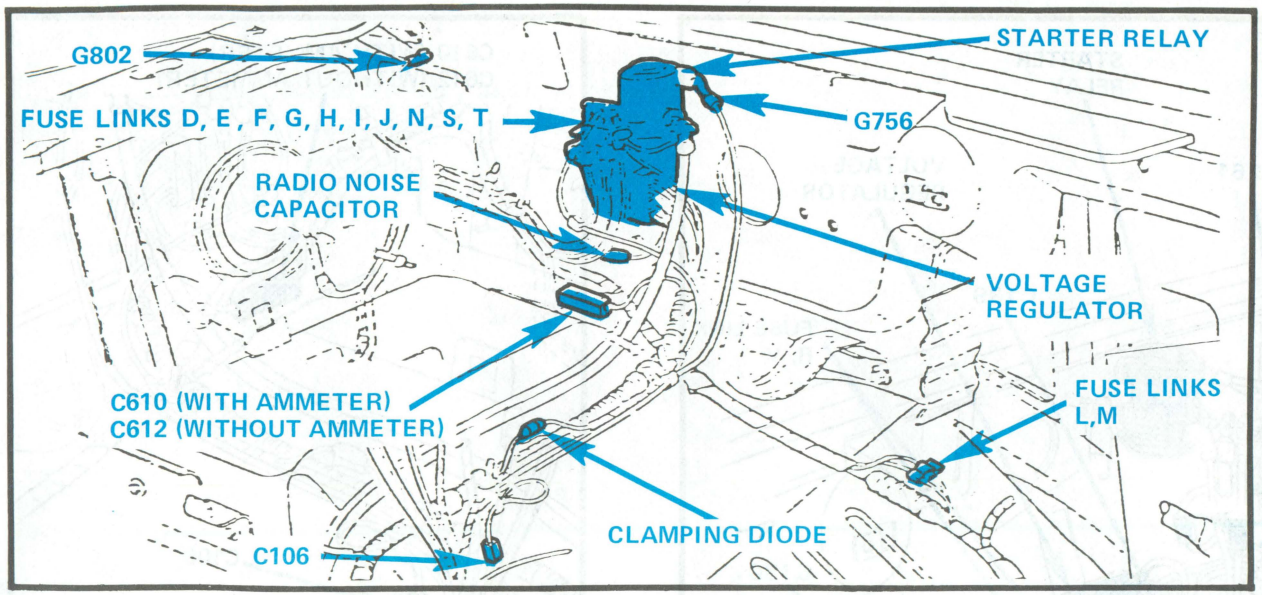


Figure 1 - RH Front Fender Apron (With EEC)

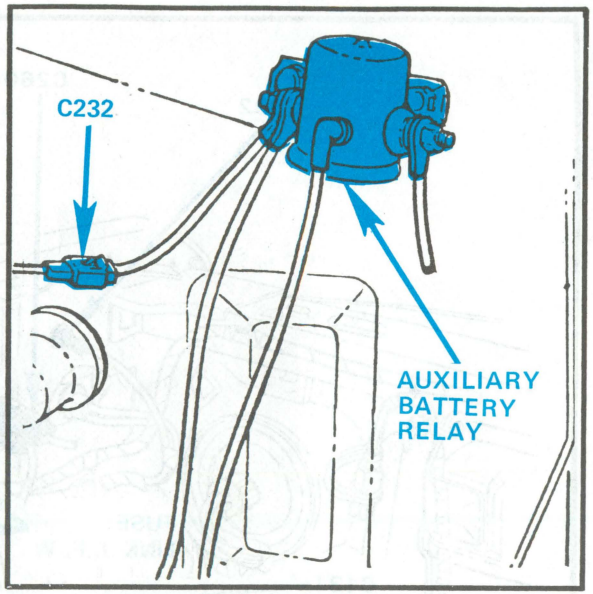


Figure 2 - LH At Side Of Dash Panel

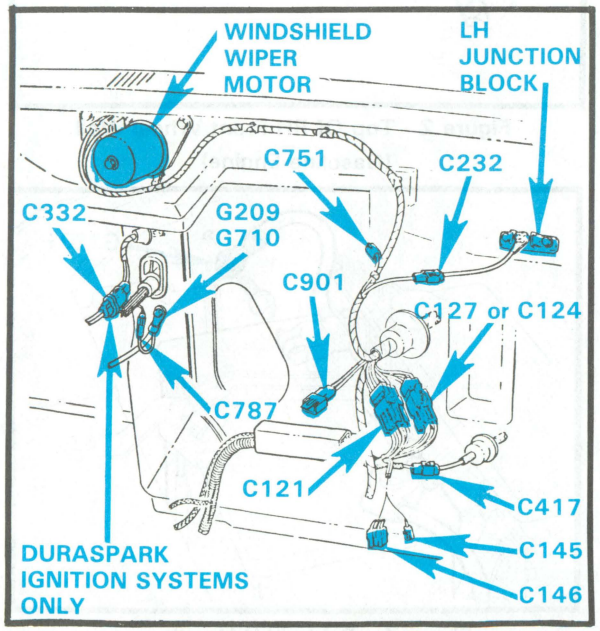


Figure 5 - LH Side Of Dash Panel

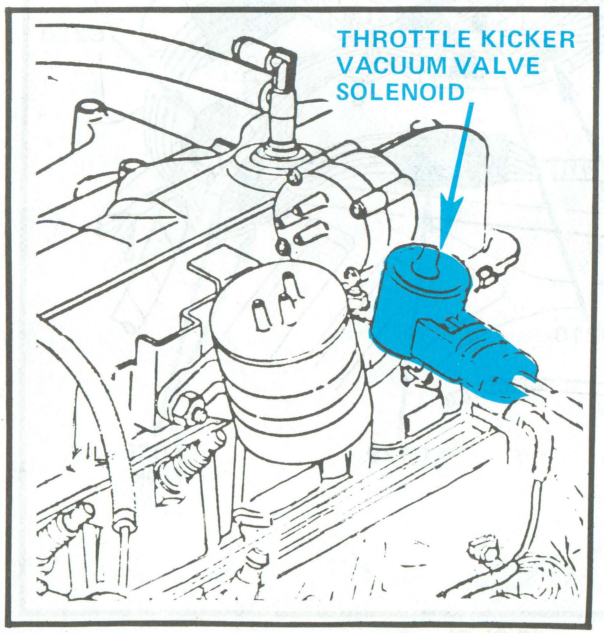


Figure 4 - LH Rear Of 4.9L Engine (Duraspark II)